THE ELEMENTS OF TRANSPORT

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PREFACE

FIRST as a student, and later as a tutor, the Author has realized the fact that no transport primer at present exists. Authors of the excellent books on transport theory and practice now available appear to assume on the part of their readers an elementary specialized knowledge that is not always present. Some students, fortunately, are able to gain a fair practical experience in various branches of the transport "craft" before taking examinations; more often, intending examinees are plunged into the transport depths without having the opportunity of acquiring a preliminary foothold.

The Royal Society of Arts Road Transport Diploma scheme, encouraging, as it does, all grades of transport employees to take the Society's examinations during a three years' period, has made the issue of this book a matter of urgency. Transport men who, owing to the isolated, individual work they do, ordinarily have little chance of learning the groundwork of transport theory, will, it is hoped, find the book of benefit. Incidentally, students of the Institute of Transport will probably realize its uses.

The book is divided into eighteen chapters in order that it may, in allowing a margin for revision, serve as a basis of a twenty weeks' course of study. It is suggested that a chapter may conveniently be read in preparation for a lecture on detailed examples of the subject-matter within the chapter. For example, in the chapter on "State Control" there is mention of specially-appointed tribunals for the purpose of controlling and adjusting rates, fares, and charges. Here there is an obvious invitation to the teacher to explain the function of the Railway Rates Tribunal of Great Britain, the Interstate Commerce Commission of the United States, the *Conseil supérieur des Chemins de Fer* of France, etc.

It is essential that the book be read with a broad outlook as applying to transport as a universal whole.

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THE ELEMENTS OF TRANSPORT

CHAPTER I

INTRODUCTION

TRANSPORT is just as old as Man. The first transport, arising from sheer necessity, was the nomadic movement of Man himself in search of food. When this transport actually commenced no one definitely knows. Nor is it certain what period of time passed before Man, tiring of interminably wandering on and on in his quest, settled at a particular spot, and visited other places, gathering or killing food to be taken back to his family.

Since its earliest existence, *the function of transport* has been the movement of Man from one place to another for a purpose, and the movement of things from where they grow, are made, or are processed, to the place where they are wanted for consumption or use.

The *need* of transport may be (*a*) economic, (*b*) social, or (*c*) military.

Transport for economic purposes—that is, as contributory to the existence of the human race and the utilization of natural wealth—is the most important. Transport enables food to be conveyed between points of supply and demand. Without transport there could be an abundance at one place and famine at another.

By moving raw materials from a natural source to a convenient place of manufacture, transport assists in the production of clothing and other articles of utility that would not be otherwise available.

The trading of goods or manufactures between a country having a surplus and another needing supplies can only be carried on if means of conveyance exist; and there would be no internal consumption of articles manufactured in a country if the transport link did not take a place in the chain of distribution to the consumer.

Industry and commerce, their creation and existence dependent upon transport, also essentially require the services of labour. If a sufficient supply of labour is not available at a centre of production, the possibility of recruitment from other places will depend upon suitable means of transport being available between residential areas and the place of employment.

Thus transport takes a vital share in the conduct of all branches of a nation's economic structure. It is not indispensable in the social life of a country, but, if it is ample and efficient, transport plays a considerable part in the promotion of civilization and culture. It helps considerably to establish social contact between persons and peoples and assists in the relaxation and amusement of the various classes of society.

Military operation has never been successful without transport. Even in primitive warfare it was needed to assist in the reinforcement and victualling of armies. In modern times the importance of transport to a commander is inestimable: it gives an army mobility and ready means of support; it is an essential of offence, defence, and reconnaissance. Unfortunately, the same transport that plays such a constructive part in times of peace may be quickly adapted to contribute to the waging of a war of destruction.

Colonization, although an economic development, is commonly a sequel to war and can be successful only if means of transport are ample. When empires of old became vast as a conqueror moved on in his victorious stride, collapse ultimately resulted owing to lack of rapid transport and communication between the central government and outposts.

Thus transport is so widely useful that we cannot easily find any feature of life (the provision of food, drink, necessities, luxuries, and pleasure, or the alleviation of pain) that does not in some measure depend upon it.

The *development* of transport has been largely due to the progress of means of communication. Transport and communications are complemental and, nowadays, so inseparable that communication is regarded as a branch of transport.

Transport may be simple (even in these modern times it is primitive where the physical conditions of a country require it) or, when it is operated scientifically and on a large scale, it may be complex. In its complexity it employs other professions and trades that are themselves, within their respective spheres, valuable contributors to a nation's life.

Although there is this complexity within itself, transport has come to be dealt with in specific divisions, such as transport by rail, road, sea, artificial waterways, air, etc. These divisions have arisen from advanced progress, and each needs, in its administration and operation, a large number of employees.

The partitioning of transport according to its means of operation tends to give an impression to those concerned with only one division that it has nothing in common with another. This is a false impression which, happily, is being dispelled by education. The divisions of transport, whether parallel or competitive one with another, are basically related in their elements.

Just as several numbers, apparently different in form, may, on being broken up, reveal common factors, so may the accepted divisions of transport be found, on analysis, to have common features which, subject only to adaptation, apply to them all.

A full understanding of the elements of transport is an essential groundwork on which to base detailed and wider studies of the various highly-developed systems of moving persons and goods from place to place.

CHAPTER II

THE DEVELOPMENT OF TRANSPORT

THE origin of transport, like that of Man, is obscure. Its early days are clothed in legend. There is nothing definite to guide the transport historian until comparatively recent times. Consequently the nature and sequence of transport's early development has to be assumed.

The oldest form of transport, nowadays known as "portering," is undoubtedly the carriage of goods by Man at the same time as he transports himself by walking. So far as it is possible with any accuracy to do so, and judging by the practice of partly-civilized tribes of to-day, it may be assumed that Woman was actually the original beast of burden. When Man, armed for defence against animals and enemies, went on unfettered and free for combat, Woman followed, loaded with their belongings and offspring.

It may be supposed that, after Man had decided to settle at one place, his first means of transport to others was by water; that dense forests and undergrowth, while protecting communities living in clearings, rendered transport by land difficult and dangerous. Assuming this to be the case, the first means of conveyance was presumably by raft. Man would have discovered the buoyant properties of logs, would have lashed several together with strong grasses and floated on them to other communities along a river.

Possibly this utilization of natural water-ways was going on simultaneously in different parts of the world. Alternatively, river transport may have been "discovered" at varying times by different peoples throughout the ages. Whichever was the case, it is obvious that, as Man penetrated along a water-way and established contact between tribes, isolation was broken down and trade was born.

As transport established intercourse and there became fewer isolated communities, first crude, then practicable, suggestions for improved transport were passed from people to people and trade developed in reciprocation to transport.

Means of water transport were probably developed to a great extent before land transport was attempted. It was found, no doubt, that by hollowing out a felled tree trunk greater buoyancy was possible and that a very light and portable boat could be made by stretching animal skins over a light framework of wood or reed.

The splitting of trees into planks allowed larger boats to be made, the size of which was not restricted to the dimensions of a tree trunk. This type of vessel, propelled first by oars, and later by wind against a sail, existed for centuries in one form or another, enabling long voyages of discovery to be made that resulted in extensive trade and colonization.

When connexion between two communities had been established by water it was probably realized that a shorter route between them would be across the intervening land and Man's thoughts turned to overcoming obstacles in the making of a land-way.

The first road through the forests of old was possibly made by the trees that were felled in clearance being trimmed and laid along the path to make a solid way. Clearance of this kind would be confined to the higher land because it would better stand the ravages of weather than the lowlands and would, incidentally, enable its users to have a good view of the approaching "traffic" of the time. Probably there would have been made on each side of the road, for protection, a marginal clearance exceeding in distance the limit of projection of primitive missiles, so that ambushes would be ineffective.

Pack animals were most probably used to carry lighter articles. Heavy, bulky loads may have been conveyed by a vehicle of the sledge type. It can be imagined that travel along a crude road by a vehicle of this kind was laborious, and little blame can be attached to early Man if he preferred to use the water, which provided little resistance, and the water vehicle, which required less energy in its operation, for his transport.

The use of rollers under, and leverage behind, a load facilitated progress but any advantage of this mode of movement was partially offset by the necessity of removing the rearmost roller from time to time and carrying it to the front of the procession. The labour which this repeated, tedious action entailed undoubtedly encouraged some coarse research which led to the discovery of the Wheel.

Whether the first wheeled vehicle was of the wheelbarrow type, propelled by man, or a kind of two-wheeled cart, drawn by man or beast, is unknown. But we know that the discovery of the Wheel was a milestone in the development of transport. The work of the genius who perceived that the cross-section of a large tree trunk, when revolving on an axle, would considerably facilitate progress, has been appreciated through the ages. Modern wheels are spoked, tyred, and braked, but the principle is the same.

The development of wheeled vehicles and the improvement of roads may have progressed at varying or commensurate rates. Up to the time of the Roman occupation of England we have to assume much, although it is known that horse-drawn war chariots were used in Britain before the Roman invasion, from which it may be assumed that suitable tracks also existed.

The Romans realized the importance of roads for military and commercial use. They planned and constructed many durable roads, upon some of which modern arterial highways have been superimposed. After the Roman evacuation the inhabitants of the country did not appreciate the excellence of the existing roads, which, owing to lack of maintenance, became overgrown and decadent.

As the centuries passed, the condition of the roads grew worse. Various expedients, such as conscription of labour and the regulation of the dimensions of vehicle wheels, were tried with the intention of improving their condition. At one time exclusive roads were provided for toll-payers. The prolonged existence of bad roads and the non-provision of bridges over otherwise impassable rivers, were largely due to ignorance of the basic principles of road and bridge engineering. Until the latter part of the eighteenth century engineers ignored the possibilities of road construction. Then the principle of consolidation was discovered. It was found that by making a road of small units there was a tendency to amalgamate by pressure of traffic as compared with large units that were separable in use.

Before improved construction came about, the bad state of the roads and the slow rate of passage of traffic over them re-directed attention to the non-resistant water-way, but the desire to make a water journey between two points in the shortest time could not be fulfilled where the river had a winding course or terminated short of a desired destination. These disadvantages were removed by construction of the canal, an artificial water-way which could be made in a desired direction and, if necessary, in a direct line, physical differences of level being overcome by the provision of locks.

The canal was yet young when transport suffered revolution by mechanization on land and sea. The use of the steam locomotive for tractive purposes, enabling large, heavy loads to be hauled upon a smooth rail track for long distances at low cost, caused the eclipse, for a time, of other forms of transport, although later the invention of the internal combustion engine brought about the revival of road transport.

The advantages of the electric motor as a means of traction were realized soon after the discovery of its principle. Electric systems and the heavy oil engines are at present being quickly developed.

During the time that Man has used land and water systems of transport he has frequently tried to emulate the flight of birds. The nature of his early experiments ranged from the fixing of wings to the human body with wax to the use of hot air for the purpose of lifting a balloon. Lighter-than-air craft were originally used for passenger-carrying purposes. At first relying on the wind for movement they could not be steered at will. Later, dirigibles were invented. Heavier-than-air machines incorporating the internal combustion engine are evolving and so, also, is the motorless glider, which is flown by the pilot's skilful utilization of wind currents.

The development of transport, which has been remarkably rapid during the lives of many living to-day, is even at this moment proceeding.

CHAPTER III

THE ESSENTIALS OF A TRANSPORT SYSTEM

THERE are three essentials of every transport system: (1) the Way, (2) the Vehicle, and (3) Motive Power. The three are sometimes perceptibly separate but certain methods of transport employ essentials (2) and (3) in combination.

In analysing the features of a transport system in relation to the essentials it is necessary to interpret the terms widely. The *Way*, for instance, is broadly anything on or in which a method of transport is operated. A railway is the most obvious user of a Way—the undertaking cannot be operated unless a continuous track is laid wherever it runs. In the operation of an air service the Way is not so apparent, but it exists nevertheless: in the absence of air specially constructed craft could not be operated.

A Way may therefore be (*a*) natural, as, for example, the sea or the air; (*b*) natural but improved by artificial means: for example, a natural harbour further protected by the provision of breakwaters, or (*c*) artificial, such as a railway or canal. If artificial, a Way may be (*a*) constructed and used exclusively by an undertaking; (*b*) constructed by one undertaking and leased for the exclusive use of another; (*c*) constructed and used partly by the constructing undertaking and partly by others; (*d*) constructed by an authority for the use of undertakings generally.

An undertaking using a natural Way has an advantage in having no initial or maintenance costs to bear, although the provider of an artificial Way may reimburse its expenditure by (*a*) the collection of rent from a leaseholding user; (*b*) the collection of direct or indirect tolls from users; (*c*) the inclusion of an amount on account of toll in its rates for conveyance charged against users. The flat rate payable in the case of (*a*) is more likely to be remunerative than the income from (*b*) or (*c*) because, the annual charges arising from the provision of the Way plus the maximum estimated cost of maintenance being known to the constructing undertaking, it is possible to debit the leaseholder with the total annual expenditure plus a profit. Even although annual charges may be known to the provider in categories (*b*) and (*c*), the income relies on the variable base of fluctuating use. The problem is so to assess the toll that (1) the cost of the Way and profits are earned; (2) the individual user pays an amount commensurate with the extent of wear and tear of the Way occasioned by the use.

Subsidiary to either a natural or artificial Way, and almost generally necessary, is the *Terminal*, which, to be efficient, must be artificial. The cost of terminal services is more accurately assessable and debitable against its users than that of the Way, although fluctuation of use is similarly a major factor.

The *Vehicle* may be as extreme as the pannier of a pack-horse or a luxurious railway coach. Both necessarily are provided for the accommodation of units transported, whether inanimate or living.

In the construction of the Vehicle one or more of the following factors enter: (*a*) speciality of purpose; (*b*) general utility; (*c*) capacity; (*d*) comfort; (*e*) speed.

A vehicle essentially has mobility but its operation may be (*a*) inflexible, as, for example, an electric car using rails; (*b*) flexible, such as a road motor, or (*c*) flexible or inflexible subject to conversion. An example of the last is a railway vehicle fitted with two kinds of wheels, one set for running upon rails and the other for use upon the highway as required. Vehicles operated inflexibly rely upon the constant forward movement of the preceding unit, failure of which results in congestion unless it is possible, by manipulation of the Way, to divert the vehicles following.

Amphibious vehicles are those with ability to use both land and water, or air and water, without conversion.

Motive power may be direct (for example, the internal combustion engine), or remote, such as electric energy transmitted from a distant generator. It may be either (*a*) tractive, or (*b*) incorporated within the vehicle. The employment of tractive power units allows interchangeability of hauled vehicles as compared with rigidity, and therefore results in increased operating capacity.

The provision of motive power may be by the operating undertaking or by a separate undertaker. In the latter case reliability of supply is essential and may be guaranteed by the operator having some interest in, or control over, the provider.

CHAPTER IV

STATUTORY UNDERTAKINGS

A STATUTORY undertaking is brought into existence by (*a*) Act of Parliament, or (*b*) legislative authority delegated by Parliament, and is commonly one requiring to provide its own Way.

Certain transport companies (those known as public utility companies) intending to operate on a considerable scale must, in carrying out the objects of the undertaking, inevitably interfere considerably with the rights of private persons. A railway or canal company, for instance, must acquire much land before construction of the way and works can be commenced. If it did not secure statutory authority to do so, it would be possible for an individual landowner to hold up a scheme by refusing to sell, or holding out for a big price; on the other hand, it might be possible, if there were no statutory regulation, for the company to "squeeze out" a property owner on unfavourable terms.

A very large company naturally has monopolistic tendencies and the need for securing statutory sanction enables some curb to be applied to the undertaking's objects if they should be too embracing. In the proposed construction and operation of the company's works, there may even be committed some public nuisance, but restriction can be applied in the granting of statutory powers.

The procedure to be observed in securing statutory authority is involved. It provides for (*a*) close scrutiny by Parliament of the intentions of the promoters of an undertaking, and (*b*) protection of private persons' rights. Before a company's private bill may be introduced into Parliament prescribed notice must be given by (*a*) advertisement in newspapers and official gazettes, and (*b*) in case of works affecting property and roads, exhibited notices on the sites. When various formalities have been fulfilled, the bill is first examined generally and it is decided whether there is a case to go forward. If the bill survives the primary examination, it is then considered by a special committee. Witnesses are brought to give evidence on the objects and possible effect of the scheme; professional advocates argue for and against it; the clauses of the bill are examined closely and amended or rejected as may be considered necessary in the public interest.

The objects of many public utility undertakings have much in common; besides requiring land they desire to regulate, by pressure if necessary, the use of their undertakings. In order to save a committee's time, to avoid repetition, and secure uniformity, clauses Acts are frequently used and adopted in private Acts.

A common analogy to a clauses Act is a tropical outfitter's catalogue. A man with no experience of the climate and customs who has been appointed to a colonial post may buy individual articles of clothing and equipment at his discretion. If he does so, his choice may be suitable or unsuitable. But if he goes to a specialist outfitter and expresses his needs, the outfitter will submit lists of clothing and equipment suitable for use in the particular colony where the customer will live. The lists are drawn up as the result of the experience of others who have lived there.

It is then necessary only for the purchaser to adopt, say, list A or list B, although, having thus been given a foundation on which to base his choice, it is open to him to amend the list provided.

Similarly, legislation has provided special public general statutes that may be adopted and incorporated in an undertaking's private Act for the purpose of enabling certain set things to be carried out, such as the acquiring of land or the making of regulations for the conduct of the undertaking's users and staff. It is necessary only for the intention to incorporate to be expressed in a private Act. Any reference thereafter on the subject covered must then be to the clauses Act, although, like the outfitter's customer, an undertaking may, in its bill, delete or add clauses to the extent to which the clauses Act is applicable to the company's objects.

Sometimes it is desirable that minor transport schemes of public utility should be encouraged, and to facilitate promotion a government department is delegated by Parliament to issue provisional orders authorizing construction and operation, thereby removing the need to apply for special Acts. Opportunity is given to objectors to express their views, as in private bill procedure, but the outstanding advantage of the order system of authorization is the saving of time of promoters and others. Orders may be issued at any time and are later confirmed by an embracing formal Act.

CHAPTER V

FORMS OF TRANSPORT UNDERTAKINGS

THE simplest form of undertaking offering transport service to others is the *sole operator*, more commonly known as the "small man," who possesses and works a business alone and distributes the profits at his sole discretion. For assistance he may employ and reward labour or be helped by members of his family. An example is the man who owns, say, two motor trucks and employs aid for maintenance and overhaul work while he and a son do the necessary driving. Too often, in cases of this type of ownership, employed relatives are not sufficiently paid by the owner and thus there exists the prime disadvantage that proper costs are not incurred, for, if "outside" labour were exclusively employed, expenditure on wages would be higher.

The scope of a business of this kind is necessarily confined. Owing to limitation of capital there can be little provision of resources or organization away from the home centre. Thus work that involves operation outside of a certain radius cannot be conveniently undertaken unless the owner makes working arrangements with other sole operators in distant parts. If he does so his independence is considerably reduced owing to the leaning towards combination.

A "small man" taking a prominent part in the actual operation of his business, as is usually the case, obviously is not able efficiently to supervise more than a small staff, and this restriction, coupled, in many instances, with lack of capital, tends to check expansion.

A *partnership*, having features that are similar to it, may be regarded as a development of the sole operator type. When a man lacks skill or money he seeks a partner to fill the deficiency. The partners are rewarded by a share of the profits proportionate to their subscriptions, but, unless there is some legal arrangement whereby one of the partners assumes unlimited responsibility and the others little or none, each has to bear an equal share of the liability for debts due by the undertaking.

There is less danger of partners not incurring proper costs than in the case of the "family" operator owing to the necessity for reasonable remuneration of the principals, but it is, nevertheless, possible for a small undertaking to be operated from day to day with little regard to financial provision for the future.

A great advantage that sole operators and partners enjoy is the ability to apply the "personal touch"; they are able to give direct and loyal service to their customers and to ensure, by individual encouragement, the efficiency of the few members of the staff employed.

Transport for reward, by reason of the service it contributes to a nation's life, can best be operated on a large scale and therefore it is not an ideal industry for the "small man" to enter. Although there are sole operators who work profitably and pass on the goodwill from generation to generation, there are others who, failing to secure a proper return from carrying alone, find it necessary to carry on hybrid businesses combining transport operation with some other trade, or suffer (*a*) elimination, or (*b*) absorption for a consideration, by a more powerful operator.

Apart from requirements of licensing laws, if any, sole operators and partners may commence operation at any time.

A number of persons interested in a transport project may form what is known in England as a *joint-stock company* but which has an equivalent in almost every country. The members of such a combination subscribe blocks of share units towards a prescribed capital for the purpose of operating the undertaking and making profits. For the individual shareholder there is limitation of liability equal only to his holdings; there is protection of others with whom the company may deal in the fact that the total limited liability has to be divulged on registration or incorporation.

Private limited companies are those which do not invite subscription of shares from the public and are usually confined, as to membership, to a small number of persons. In this kind of company, the number of directors being small, it is possible for each to devote his attention strictly to some particular part of the firm's organization. Thus, while being more stable than the sole operator, the private company may still have the advantage of personal contact with its staff and customers.

As private companies seldom operate on more than a medium scale, a company requiring a large capital in order to operate extensively usually invites subscription by the public and is known as a *public limited company*. The liability of the individual shareholders is restricted to the amount of share capital held. As the number of shareholders is necessarily large in this type of company, the actual control of the business has to be delegated to a representative board of directors and it is therefore important that the members of the board should be chosen carefully. An individual shareholder has little chance of interfering with the management of a public company but has an opportunity of criticizing, if necessary, at the annual general meeting. Sometimes a shareholders' association is to be found working in close co-operation with the board, often to the company's good, where representative committees of the shareholders' organization include experts or business men of ability.

Public utility companies are those which are worked on a vast scale in the public service. The share capital is usually of the same type as that of a public limited liability company and the control may similarly be in the hands of a board of directors. The nature of the operation of a public utility company and the need for ensuring reliable service usually render it necessary for statutory powers to be secured for the purpose of bringing the company into existence.

Another form of statutory utility undertaking is the *public authority* set up as an autonomous body for the purpose of providing indispensable service. Capital may consist entirely of loan issues, or partly of loans and stock, with fixed or variable interest according to the undertaking's terms of existence. The method of control is various but is prescribed in the private statute authorizing the establishment of the undertaking. The board of control is usually appointed by authorities and bodies controlling the territory in which the undertaking operates. In certain cases trustees are appointed for the purpose of choosing the board members. Some boards consist of appointed members and also members elected by the stockholders. Interest on capital may be fixed or variable: often it is fixed, any surplus revenue being distributed to consumers in the form of further benefits.

Municipal authorities often provide transport services as a civic duty, the capital usually being supplied by loan issues. Profits are primarily appropriated to the liquidation of loans, but may sometimes be used to relieve other non-profitable services provided by the municipality. On the other hand, if there should be extravagance of operating expenditure, or if for any other reason the undertaking's working should result in a loss, the local general revenue is called upon to provide a subsidy.

Management of a municipal undertaking is purely in the hands of the local authority, through a committee, and this sometimes results in operation being directed particularly to the benefit of a restricted area.

What is the ideal form of undertaking depends upon requirements of operation and the ability of the advantages of a particular type to outweigh the disadvantages when applied in specific circumstances.

CHAPTER VI

STATE CONTROL

THE nature of State control of transport varies but there is scarcely an undertaking that is not controlled to some degree. Control may be national (or federal) or local.

The highest form of control is complete *ownership* and management of a nation's transport by the State. Management may be by a central government body through a minister, or by a joint administrative body consisting of government representatives and members appointed by trading and commercial interests. Absolute State undertakings usually enjoy practical assistance from other government departments (for example, the clearance of trees by a forestry commission in order to facilitate the construction of a way) and financial help, where a deficit arises, in the form of a direct subsidy from public funds. In some instances, to meet a deficit, an advance may be made as a temporary measure and required to be taken to debit as a liability to be cleared, if possible, during a future financial period. If there should be a surplus it may be devoted to (*a*) improvement of the undertaking's services; (*b*) reduction in fares and rates, or (*c*) the relief of other State services showing deficits.

Not far removed from complete ownership is the granting of a *concession* in respect of an undertaking set up and possibly previously operated by the State. A concession is usually for a long term of years but a maximum may be prescribed by law, the undertaking reverting to the State in due course.. An operating concession may be the subject of outright payment or the State may accept shares in the undertaking as part of the consideration. To offset any rigid obligations of service by the *concessionnaire* there may be State guarantee of capital, interest payments, or even of debts.

State-owned undertakings necessarily operate as monopolies. The terms of a concession may include protection, or partial protection, from competition during the whole term of the concession or a lesser period.

A State's responsibility to its subjects is generally accepted to include a duty to construct trunk highways out of revenue from national taxation, the provision of secondary and tertiary roads usually being the duty of local authorities.

State *consent* may be required by private enterprise in the form of (*a*) direct or delegated legislation, or (*b*) licence for the operation of transport. Suppression of services for prescribed reasons may be a right of the State.

What are regarded as duties by a State-owned undertaking, for example the carriage of mails, may be imposed upon privately-owned services as *obligations*. An obligatory duty to carry may be accompanied by a requirement, amounting to the imposition of a *levy*, to convey at reduced rates for purposes of (1) national defence (e.g. troops and equipment); (2) State administration (e.g. high officials); (3) communication (mails); and (4) social development (e.g. workmen, students, children). There may be even compulsory free conveyance (e.g. poor peasants and war-disabled men).

State *supervision* of the operation of public transport undertakings through a central government department (by direct inspection) or regional authorities (e.g. by a system of licensing) may include the right to make orders relating to adequacy, continuity, or through working of services, safety of passengers, size, construction and speed of vehicles, the reliability of operating staffs, and compulsory insurance against operating risks.

The *control and adjustment of fares, rates, and charges* may be the exclusive duty of a specially-appointed tribunal or commission. This type of supervising body is usually independent of the State in normal practice but responsible to a government authority in certain circumstances relating to principle and answerable at law to complaints of aggrieved parties. Miscellaneous matters relating to transport bodies that may also come within a tribunal's jurisdiction are methods of accountancy and rendering of returns, conditions of carriage, the issue of capital, and the observance by undertakings of their objects.

CHAPTER VII

CAPITAL AND FINANCE

CAPITAL is money invested in an undertaking to enable it to operate for profit. The study of the subject becomes involved when considering the capital of large undertakings and often raises controversial opinions as to its treatment.

The following illustration explains simply the accepted meanings of terms related to the capitalization of an undertaking: A man has £400 on which to set up, as sole operator, a motor haulage business. He may have saved the money from his wages while employed by another or it may have been a gift from a rich uncle, but from whatever source he secured it, he now intends to use the money in a certain way in order that it may earn a profit.

He buys a motor truck for £200. For £100 he buys a freehold shed in which to keep it. The truck and the shed are his *fixed assets*. In the operation of his business he will need stores and fuel and part of his remaining £100 will be spent on getting in a stock of these necessaries. These, together with cash in hand, his credit bank balance and also, after commencement of operation, money due to him from others, are his *floating assets*.

The £400 is the man's capital. It is "sunk" in the undertaking. If the business should fail he would have to save as much as possible from the wreck by realization of his available assets.

To be thoroughly successful his business must enable him to preserve his capital and secure for him in addition a certain return for it, for, if the money had been deposited in a bank, or invested, it would have earned interest. But after a day's work, the motor truck, part of the capital, will not be in the excellent condition it was when delivered by the manufacturers. After a week's work it will be less valuable than at the time of purchase. Obviously, at the end of a year, the owner could not sell it for the price he paid. It will have become less valuable to him and less desirable in the eyes of likely purchasers. If, then, the truck should be sold after a time and only £50 realized, the man's capital will have been reduced by £150 unless he has made some provision for *depreciation.*

There are two principal methods of provision against this wearing away of assets, so that, when it is necessary to purchase others by way of renewal, a sum equal to the amount originally expended is available for the purpose. In both methods the asset is allotted a "life": the estimated maximum term of years it will be usable. At the end of its life a motor truck will be of a certain value at least as "scrap." This value, known as the *residual value,* is estimated at the same time as the vehicle's life and deducted from the initial capital cost. Suppose, in the present case, the residual value of the man's truck, after six years' life, is £18; deducting this from the capital cost of £200 leaves £182 to be found by the time the vehicle's life has expired.

By the first method there is provision for depreciation over the six years at an equal rate per annum, that is, the £182 is divided by six and the quotient, £30 6s. 8d., is put by each year until £182 has accumulated. For the purpose of buying a new vehicle the owner has in hand at the end of six years £182 in cash, which, with £18 he receives from the sale of the old truck for scrap purposes, provides him with the purchase price of a new motor.

The following table shows the value of the truck on the books at the end of each year—

Year	Value at the Beginning of the Year			Amount of Depreciation			Value on Books at the End of the Year		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
1 . . .	200	0	0	30	6	8	169	13	4
2 . . .	169	13	4	30	6	8	139	6	8
3 . . .	139	6	8	30	6	8	109	0	0
4 . . .	109	0	0	30	6	8	78	13	4
5 . . .	78	13	4	30	6	8	48	6	8
6 . . .	48	6	8	30	6	8	18	0	0

By the other method a fixed percentage is allowed each year on the value of the beginning of the year. The result is the same: the residual value is reached in an equal number of years, but the provision for depreciation is greater during the first years of the life and less during the later years when repairs are likely to be more costly. That is to say, a higher rate of depreciation is allowed when the owner can better afford it and the value of the vehicle diminishes at a quicker rate.

The table given at the top of page 28 illustrates the second method, allowing 33⅓ per cent over six years.

It will be seen that neither of these methods takes into account the variations in market values likely to arise during the six years and it is perhaps not advisable to attempt adjustment to meet such variations.

Year	Value at the Beginning of the Year			Amount of Depreciation (at 33⅓% p.a.)			Value on Books at the End of the Year		
	£	s.	d.	£	s.	d.	£	s.	d.
1	200	0	0	66	13	4	133	6	8
2	133	6	8	44	8	11	88	17	9
3	88	17	9	29	12	7	59	5	2
4	59	5	2	19	5	1	39	10	1
5	39	10	1	13	3	4	26	6	9
6	26	6	9	8	15	7	17	11	2

Sometimes it is necessary for the body of a vehicle to be depreciated at a quicker rate than the undercarriage or chassis on account of the lesser durability of the body.

When an asset is acquired by means of hire-purchase there should be, strictly speaking, allowance for depreciation from the commencement of payment of the instalments in order that the replacement may be bought for cash. In the case of leasehold buildings it is necessary to allow depreciation for the number of years of the lease, less one, the allowance for the last year being allocated to dilapidations.

In addition to depreciation, which is a natural wearing-out of an asset, transport undertakings commonly have to allow similarly for *obsolescence,* which is an artificial shortening of an asset's life: although still sturdy it becomes unsuitable for use owing to changed conditions of operation or a variation of the public taste.

There is an important exception to the general rule that allowance should be made for depreciation, namely, in the case of an undertaking owning a single ship. A ship lasts for so long a time that there would be little advantage in accumulating a depreciation fund over the many years of its life. Usually dividends are paid without deduction. They are, in effect, refunds of capital from time to time, and when, at length, a new ship is required, the cost has to be subscribed.

As a rule a local authority does not allow for depreciation of an asset, the purchase of which has been made possible by the provision of a loan. Repayment of the loan is usually spread over the life of the asset. An amount is then set aside each year towards repayment at the end of the time and interest is paid currently to the subscribers. Thus, at the end of the asset's life and, coincidentally, the end of the term of loan, the authority has sufficient in hand for repayment and is able to borrow again.

The capital of a railway company is necessarily enormous and much of it irrecoverable in case of failure of the undertaking.

An undertaking may be financed by (*a*) shares subscriptions, and (*b*) loans.

Shares are classified according to preference of treatment in the distribution of profits and may be (*a*) *preference*, carrying priority in dividend payment at a fixed rate; (*b*) *ordinary*, ranking for dividend at varying rates, after payment of preference dividends, according to the amount of profit to be distributed, and (*c*) *deferred*, on which dividends are paid only after the preference and ordinary dividends have been paid.

On incorporation of an undertaking the share capital is registered and is known as the *registered* or *authorized nominal capital*. The full capital powers are not necessarily used at once; the extent to which advantage is taken of them is indicated by the amount of *issued* capital. The issued capital may be subscribed by members at various times, according to the requests of the directors or managing body, and the amount paid in cash is said to be "*paid up.*"

The providers of loans and holders of debentures are creditors of a company and are entitled to satisfaction by payment of interest before the amount of profit distributable to the proprietors is calculated.

A loan is usually for a fixed term of years and repayment is effected by putting away an amount from revenue each year so that a lump sum is available at the end of the term. This procedure is similar to that followed in providing for depreciation; the wiping out of a loan is termed *amortization.* A *sinking fund* may be established for the purpose of refunding loans, the annual payments being adjusted to constitute a principal which, with compound interest earned in a given number of years, provides the amount of loan repayment at the end of the period.

The *working capital* of an undertaking is that not already sunk in fixed assets and is used to meet current demands.

CHAPTER VIII

ORGANIZATION

EVEN in the smallest transport undertaking there is usually some attempt at organization in the form of sharing of duties to prevent overlapping. Various jobs of work are given regularly to particular employees who, owing to special knowledge or aptitude, are able to carry them out efficiently for the good of the firm. In the case of a large undertaking the need for a systematic allocation of responsibility is obviously great, especially where the territory covered extends for long distances from the headquarters centre. Proper organization results in efficient operation and diminishes costs.

The work of a transport undertaking of any size is noticeably divisible into essential sections or departments. Whether a statutory or non-statutory concern, before it can be operated a *secretarial and legal department* has preliminary work to do in order to bring it into existence. It may be necessary for statutory powers to be secured, for some legal registration to be made, a licence to be obtained, or finance to be conducted. Although, after preliminary work, there may be failure to bring the undertaking actually into being, work for the secretarial department exists during the time that promotion is being attempted. If the undertaking should be successfully launched, the secretarial department continues to be necessary. If the legal work to be done is small, it may be included in the secretarial duties or, if sufficiently large, may be the responsibility of a separate department under a legal adviser.

After the securing of powers or prescribed permission, but before actually commencing to operate, the undertaking will have to provide at least certain works and vehicles and possibly a special way. This is the duty of the *engineering department*, which may be sub-divided into civil and mechanical departments, the former constructing and maintaining buildings and works of a fixed nature, the latter purchasing or constructing stock and mechanical appliances, and maintaining them until the time comes for renewal.

When the undertaking has so far progressed as to have vehicles available for the conveyance of traffic and also, if necessary, the way upon which to operate them, there comes a need for a *commercial department* to secure customers and to fix and collect rates, fares, and charges for conveyance.

The *operating department* next has to be available for the purpose of moving the stock and the traffic it carries.

Both the commercial and operating departments are thus actually in contact at some period of its movement with all traffic, and for this reason the two are usually known and sometimes organized collectively as the *traffic department*. The commercial department is commonly known as "the earning department," and the operating as "the spending department." Better descriptions would be "earning" and "helping to earn," for the operating department spends only for traffic purposes and, if efficiently operated, its work indirectly creates further demand, through the commercial department, for transport.

When money has been collected and debts incurred by the undertaking, there must be an *accountancy department* to check the income, pay out necessary amounts and report the financial position when requested at any time.

All these departments require things for use, either in the domestic work of each or in connexion with the business of the undertaking. It is the responsibility of the *stores department* to order and keep a sufficient stock of material to meet the needs of the others.

Co-ordinating the work of the essential departments and responsible to the proprietors of the undertaking there must be a *management.*

It should be possible for the departments (secretarial, legal, engineering, traffic, accountancy, and stores), each directed by an officer responsible to the management, to conduct all the normal business of the average transport undertaking, but where, owing to its size, there is considerable work in certain directions, work may be taken from one department and made the responsibility of a further separate department. An example is advertising, which, although closely related to the commercial department, may, if extensive, justify the setting up of a separate organization for the purpose of concentrating all matters relating to publicity under one office.

The formation of a separate department may sometimes arise out of an opportunity to operate the undertaking as cheaply as possible. An example of this is the *purchasing agent* through whose hands pass all matters relating to buying for all departments. Specialization and the ability to bulk orders from various internal sources for the same type of material, enable costs to be reduced.

Examination of the organization of any large transport undertaking will reveal that certain of the departments are essentially confined to the headquarters, but that others, especially those either directly or indirectly concerned with traffic movements, are links between headquarters on the one hand and the unit of traffic conveyed or hauled on the other. Between the extremes are various subordinate officers with descending degrees of responsibility.

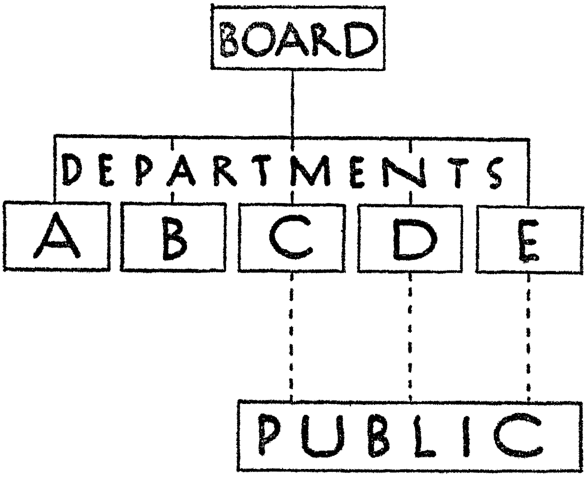

Fig. 1

The chart in Fig. 1 illustrates a simple example of *departmental organization.* Outstanding features of this are: (1) the head of each department is directly responsible to the board, and (2) the departments C, D, and E actually in touch with the public make independent contact. Thus, while there is a heavy duty upon the board to co-ordinate the various views on policy held by the departmental heads, there is lack of combination in dealing with customers that might cause a mild form of competition within the undertaking itself, especially if a customer were to learn of the weakness and take advantage of it.

Obviously some intermediate officer is necessary at the top in order to co-ordinate matters of policy raised in the departments and so to relieve the board considerably. But when an administrative manager is included in schemes of departmental organization there still remains a need for co-ordination at the bottom of the scale, especially where the undertaking serves a vast area and the executives are not easily able to get into touch with headquarters. This may be achieved by adopting *divisional organization.*

The chart in Fig. 2 is similar to that previously given, except that (*a*) a co-ordinating officer has been inserted between the board and the active departments C, D, and E, and (*b*) the contactual unit dealing with the public is a divisional officer who is responsible equally to the heads of departments C, D, and E, but who has complete authority within his division on all matters other than policy. The advantages of the divisional system will be readily seen: the staff looks only to one man for orders that cannot be contradictory within the division; the public meets one man who, as the sole representative in the area, is aware of all proposals and complaints emanating from the users; there is no delay due to consultation between local departmental officers or reference to departmental headquarters as there would be under the departmental system.

Within each division the staff may be organized independently, but owing to the smallness of a division compared with the size of the whole undertaking there are possibilities of actual contact between the divisional officer and even the lowest grades. An officer with an attractive personality may, by a stimulating supervision, do much to off-set the impersonal atmosphere of a large organization.

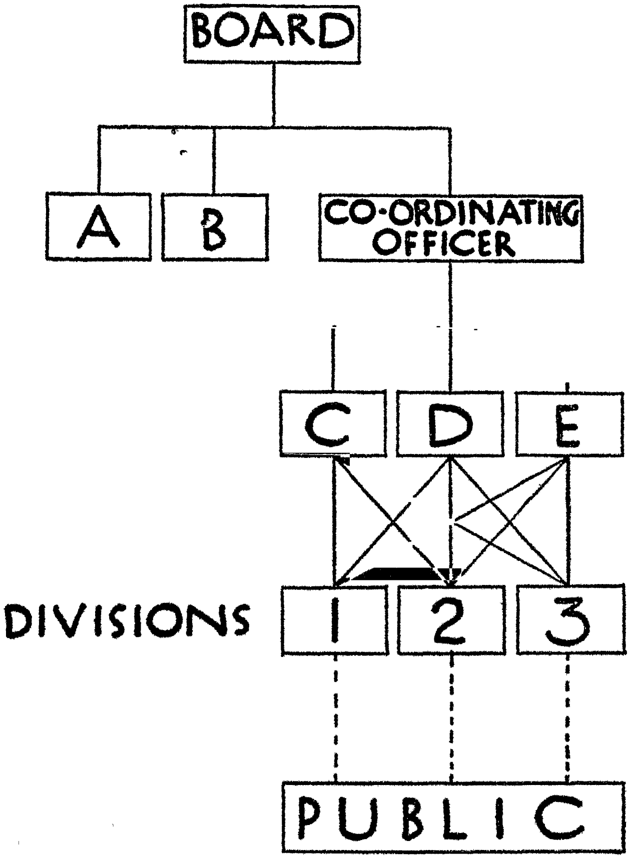

Fig. 2

In the divisional system departments A and B may,

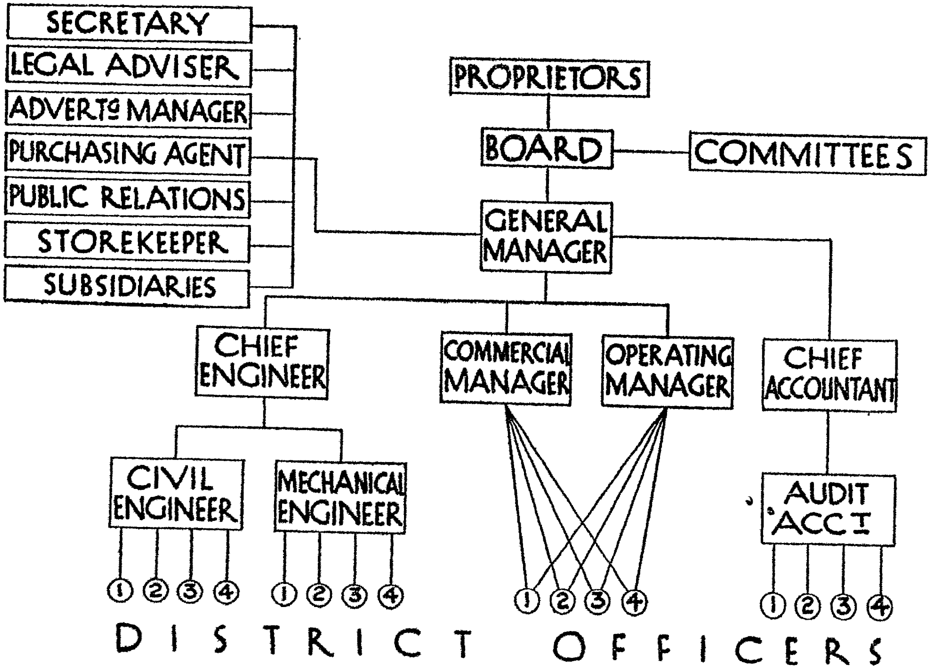
SECRETARY
LEGAL ADVISER
ADVERTG MANAGER
PURCHASING AGENT
PUBLIC RELATIONS
STOREKEEPER
SUBSIDIARIES
PROPRIETORS
BOARD
COMMITTEES
GENERAL MANAGER
CHIEF ENGINEER
COMMERCIAL MANAGER
OPERATING MANAGER
CHIEF ACCOUNTANT
CIVIL ENGINEER
MECHANICAL ENGINEER
AUDIT ACCT
① ② ③ ④
DISTRICT OFFICERS

FIG. 3

if their work is of a formal nature related to that of the others, get into touch with the divisions either through the heads of departments C, D, or E, or directly.

The organization charted in Fig. 3 is that of a typical transport undertaking, and, it will be seen, is a useful combination of the departmental and divisional systems.

A further scheme of organization sometimes encountered is that which incorporates the duties of chairman of the board and general manager in one officer known as the president of the undertaking. Assisting and responsible to him are vice-presidents, each having complete charge of a department. The departments in this type of organization share the work on logical lines and there may be still a trace of divisional organization at the lower end.

Regional or area organization is the splitting up of a large undertaking into several areas, each of which has its own general manager and internal organization. The area managers are responsible to the general manager of the whole undertaking who deals with matters of policy. Frequent meetings of inter-area committees are held to discuss matters affecting the whole undertaking's practice, thus ensuring unity of action.

CHAPTER IX

REVENUE AND EXPENDITURE

THE revenue of a transport undertaking is its income derived from carriage or sources related to it. It includes fares paid by passengers, tolls or rates paid in respect of goods and miscellaneous services, profits from jointly-owned undertakings, and interest on investments in other undertakings.

In a vast undertaking the efficiency of the collecting unit is important; a great revenue is often but an aggregation of a large number of small payments. Petty losses may be prevented by (*a*) choice of suitable collecting staff; (*b*) provision of adequate checking staff; (*c*) use of a suitable book-keeping system; (*d*) mechanical aids.

Passenger fares are customarily collected before or at the time of travel; freight rates and tolls are payable at the time they are incurred or later.

The income as received from all sources without any deduction is known as the *gross revenue.* Out of this must be taken fixed charges (such as interest on loans) and various expenses in connexion with the provision of the services of the undertaking; the remainder is the *net revenue* which is available for distribution as interest on shares or appropriation to funds.

The gross revenue can never truly indicate the success of an undertaking but it may reflect a nation's or trade's prosperity or depression. Although gross revenue may slightly react to good management, it more often depends upon the ability of its customers to take advantage of the undertaking's services.

Nor can net revenue always be accepted as a true guide to an undertaking's real income. Expenditure is naturally variable but may be artificially varied as, for instance, when maintenance costs are deliberately not incurred in a given year. If maintenance should be deferred for several years, ultimate expenditure will be greater in one year than it should be normally. Thus it is inadvisable to gauge the success or failure of the operation of a transport business without comparing items of expenditure with previous years' accounts.

The foremost item of revenue is the actual receipts from the carriage of passengers, passengers' luggage, merchandise, minerals, milk, and mails. An undertaking may carry one or more of these types of traffic, and the income from them, together with miscellaneous receipts from sources related to actual conveyance, is known as the *gross traffic revenue.*

It is usual to deduct immediately from the gross traffic revenue the *operating expenses*, or the direct cost to the undertaking of supplying everything related to the conveyance of the persons or things from whom the gross traffic revenue is received. Operating expenses include the cost of maintenance of the track (if supplied by the undertaking), buildings, and vehicles; provision of power and fuel; wages and clothing of traffic staff; cleaning and miscellaneous expenses; taxes and duties on vehicles and fuel; contribution to maintenance reserve fund and renewal (due to depreciation and obsolescence) and general expenses, such as remuneration of the directors; insurances; salaries of administrative (including accountancy) staff; rates and taxes; compensation to passengers, traders, and employees; cost of solicitation of traffic and advertising.

Although these expenses are incurred for the purposes of operating the undertaking as a whole, some of them are directly and exclusively debitable to the cost of actually moving the traffic and are called *traffic expenses*. The percentage of traffic expenses to the gross traffic revenue is sometimes called the *transportation ratio*; the percentage of operating expenses to the gross traffic revenue is commonly known as the *operating ratio*. For example, if the gross traffic revenue is £10,000 and the total operating expenses are £7000, the operating ratio is 70. If, of the £7000 the traffic expenses are £4500, the transportation ratio is 45. Deduction of the operating expenses from the gross traffic revenue leaves the *net traffic revenue*.

The revenue account will include, in addition to traffic revenue, receipts from other sources such as rents from leases to other undertakings, from the letting of property, or from advertisers on property or vehicles (less, in each case, the expense of collection); income from investments or jointly-owned undertakings and subsidiaries. It will also include such charges as rents payable to other undertakings or persons, interest on loans and income tax, if applicable.

Shown in mathematical form, the *net revenue* is—

$$\begin{pmatrix}\text{Gross traffic revenue} \\ \textit{less}\text{ operating expenses}\end{pmatrix} + \begin{pmatrix}\text{Other receipts }\textit{less}\text{ charges} \\ \text{other than operating expenses}\end{pmatrix}$$

The distribution of the net revenue may be prescribed by statute in the case of a public authority or corporation, but the majority of undertakings usually allocate it to (1) payments to sinking or redemption funds; (2) interest on preference stock; (3) interest on other stock, the balance, if any, being transferred to reserve.

Revenue may be restricted by statute to a precribed standard, and any surplus earnings above it re-distributed to the users of the undertaking in the form of reduced rates and fares.

CHAPTER X

RATES, FARES, AND CHARGES

TRANSPORT, considered as a commodity for sale in various quantities, is difficult to "price."

Usually the cost of an article is definitely ascertainable by the producer and charged accordingly to the middleman. By the addition of a margin the middleman arrives at his charge to the retailer, who, in turn, adds a margin and sells to the ultimate consumer. But a transport undertaking is both producer and retailer of its commodity and often the magnitude of production prevents the true cost of the movement of a unit being calculated.

If a lad conveys an article from a village to a market town for another person by the simplest form of transport—"portering"—he incurs some cost in doing so. It may be only the cost of the slight wear of his boots, and perhaps of a strap which he may use in suspending the load over his shoulder, but, whatever the cost, and fractional as it may be, it is definitely incurred in the conveyance of the load.

If the demand for services becomes so heavy that he finds it necessary to buy a barrow, his costs immediately increase. The cost of the barrow, say £3, is an item of capital expenditure and therefore it should earn interest for the owner just as it would have done had the £3 been deposited in a bank. Payment by a customer for a barrowed load must therefore include a contribution to the amount of interest. A barrow, like any other vehicle of transport, has a restricted "life" and a further contribution should be made towards an allowance for depreciation.

The rent of a barn in which to "house" his barrow, and any other charges the lad has to meet whether the barrow is moving or idle, must be debited against, but spread over, all the work it does and a fair share borne by each unit conveyed. These are the *fixed* or *standing charges.*

The cost of even such a simple means of transport as barrowing is not, however, complete when all the standing charges have been duly debited. Every time he runs the barrow the lad incurs further expense. The axle-grease is slightly consumed; the tyres of the wheels are worn a little; the painted surface of the barrow is tarnished; during darkness a candle or lamp-oil is consumed. All these expenses are directly due to the running of the barrow: if it were to stand idle in the barn, the *running expenses* would not be incurred. Therefore the cost of moving a load, that is, the *cost of service* to the person using the transport provided by the lad is (1) a proportion of the standing charges, plus (2) the actual running expenses.

If the round trip to and from market is made three times a week, the lad knows that he is operating 156 times a year. He is also aware of his standing charges and by dividing them by 156 is able to arrive at the share of standing charges to be borne by each load. His actual cost statement is—

ANNUAL STANDING CHARGES	£	*s.*	*d.*
Interest at 10 per cent on capital expenditure of £3		6	0
Depreciation calculated on a five years' life at an equal rate per annum		12	0
Rent of barn at 1s. per week	2	12	0
Fire insurance of barn and barrow, per annum .		8	0
TOTAL ANNUAL STANDING CHARGES .	£3	18	0
Share to be borne by round trip (156 per annum) .			6

COST OF OPERATION PER ROUND TRIP		£ s. d.
Share of standing charges brought forward . .		6
Running Expenses—	s. d.	
Axle-grease consumed	1	
Wear of tyres.	2	
Maintenance (painting, repairs). . . .	2	
Lamp-oil	1	
		6
TOTAL COST OF OPERATION. . .		1 0

The running expenses should strictly include an item representing wages even although the lad operates his own barrow. If he should engage a boy to help in pushing the barrow uphill, the wages of the "booster," say threepence, should be debited to the cost of operation as a running expense because it is definitely incurred in connexion with the actual running of the barrow. Carrying this simple illustration further: supposing it should be necessary for the lad to secure a licence from the parish council to operate, the cost, being a payment that must be made whether the barrow is used little or much, should be included as a standing charge.

If the lad charges his customer two shillings per load, he makes a shilling profit because the *net cost of operation* in both directions is one shilling. This method of charging is known as *cost of service plus profit.*

If the barrowed goods are sold for eight shillings in the village and can be sold for ten shillings at the market, the two shillings difference in value at the place of arrival compared with that at the place of departure is the *value of the service of transport.* When the lad portered the goods and charged, say, one shilling, the traffic passed because the cost to the user of the transport service was within the margin of value. The traffic passes when barrowed at two shillings because it equals the value of the service of transport. If the lad were to find it necessary to ask for three shillings per load, it is safe to assume that the traffic would not then pass because it would be necessary to offer the goods at the market for eleven shillings in order to recover all costs. The excess of one shilling above the normal selling price of ten shillings would prevent sale.

The greater an undertaking the heavier are the standing charges; but while they are to a great extent constant, the running expenses increase or decrease according to the mileage operated. The largest undertakings, those whose capital expenditure is very high and which are operated on a large scale, cannot allocate the cost of service with certainty. Much of the capital can only be charged to the working of the undertaking as a whole, and not for any particular service; the same applies also to a considerable amount of the annual expenditure.

The method of rate fixing where cost of service is not strictly ascertainable is by *differential charging*. A vehicle moving from A to B may carry in one load three classes of goods, say coarse paper, cheese, and silk. The value of the service of transport of the goods may be one shilling, two shillings, and three shillings per ton respectively. By the cost-of-service-plus-profit system of charging the rate per ton for conveyance may be, say, tenpence, in which case the traffic passes because the rate is within the amount that the lowest grade of goods carried (that is, the coarse paper) can "bear."

If the actual cost of service towards the vehicle is not definitely calculable, but the total charges of the undertaking are known, the rates of conveyance must be fixed with the object of earning the greatest possible amount of revenue, but at least an amount exceeding the total operating costs. By the system of differential charging it would still be possible for the three classes of goods to be carried in the same vehicle, but the charges for conveyance would vary between them. The coarse paper might still be charged at tenpence a ton, but the rate for the cheese might be 1s. 6d. and, for the silk, 2s. 10d. The traffic would pass because each kind of goods would be called upon to pay an amount within the value of the service of transport: each rate is based on "what the traffic will bear."

In the classification of goods for the purpose of differential charging the following factors are taken into consideration: (1) the value of the goods; (2) bulk in relation to weight; (3) liability to damage in transit; (4) method of packing; (5) urgency of delivery; (6) handling costs.

Charges, after basic determination according to a classification, may be made at (1) a flat rate, or, on acceptance of the fact that, as the distance increases, the cost of conveyance increases, but less proportionately, (2) a tapering rate.

Zone rates are those charged at a flat rate upon the unit conveyed (*a*) irrespective of distance, or (*b*) irrespective of the distance except within prescribed zones.

Simple illustrations of the various methods of charging are given in the comparative table on page 48.

"Exceptional rates" (those below, but having some relation to, standard rates) are charged in special circumstances.

In addition to conveyance, a consignment may require terminal services provided by (*a*) the carrier, or (*b*) another undertaking. Terminal charges usually are flat and bear no relation to the distance the goods are to be, or have been, conveyed, but are calculated to cover the actual or estimated cost of service. In cases where terminals are provided for the unrestricted use of all, flat tolls may be levied for the purpose of providing services of benefit to the users generally.

METHOD OF CHARGING	Up to 10 miles	From 11–20 miles	From 21–30 miles	From 31–40 miles	From 41–50 miles	51 miles and over
	Per ton Per mile d.	Per ton Per mile d.	Per ton Per mile d.	Per ton Per mile d.	Per ton Per mile d.	Per ton Per mile d.
1. Flat Rate per ton per mile . .	3	3	3	3	3	3
2. Tapering Rate .	3	2·9	2·8	2·7	2·6	2·5
3. Flat Rate per ton irrespective of distance . .	5s.					
4. Flat Rate per ton per zone . .	Up to 20 miles 3s.		Up to 40 miles 5s.		Up to 60 miles 7s.	

Example. The charges for conveying 10 tons for 30 miles at the various rates would be—

METHOD 1: 10 tons × 30 miles × 3d. = £3 15s. 0d.
2: 10 tons × 30 miles × 2·8d. = £3 10s. 0d.
3: 10 tons × 5s. = £2 10s. 0d.
4: 10 tons × 5s. = £2 10s. 0d.

The fixation of passenger fares differs from the making of goods rates in certain respects, but there still requires to be taken into consideration the value of the service of transport. In the conveyance of goods it is the difference in value at the forwarding and destination points; in the carriage of passengers it is the value to themselves that the passengers place upon their travel.

A man's journey may be a matter of necessity, business, or pleasure, and the value he expects to derive from it varies in individual circumstances. The maximum fare it is possible to charge will depend upon (*a*) the amount of money he has to spend, (*b*) the attraction of the destination; (*c*) the advantage he will derive from the journey, and (*d*) its duration.

Terminal services are, in the conveyance of passengers, performed by the passengers themselves, and it is necessary only to fix a fare for actual conveyance.

Two important factors in transport, namely, time and cost, enter into the consideration of passenger travel classification. There may be a small number of classes with a number of fares applying to each or several classes with few fares applicable.

Compulsory classification exists to a small degree: it may arise from the presence of a colour bar (in some countries) or the necessity for requiring certain passengers (for example, workmen, scholars, apprentices, etc.) to comply with definite conditions of travel. More commonly, however, classification is voluntary. The passenger chooses his class according to (*a*) his ability to pay, (*b*) the time within which he desires to reach his journey's end, and (*c*) the extent of his desire for comfort.

The distance the passenger is to be carried is usually the basis of charging, although it is possible, in the operation of certain means of transport, to ascertain the cost of service and charge accordingly. Fares based on distance may be charged at (*a*) a flat rate per mile based on the shortest route between two places, (*b*) zone rates, or (*c*) a flat rate applicable to the whole of the undertaking's system. Charges in respect of comfort or exclusiveness of travel may be added to make an inclusive fare or there may be supplements for the purpose.

As a means of creating travel for the purposes of keeping its vehicles (*a*) loaded, and (*b*) moving to the fullest possible extent, an undertaking may reduce the fares ordinarily charged in order to encourage (*a*) regularity of traffic, and (*b*) the offering of traffic in quantity. Season, contract, and commutation tickets usually allow an appreciable reduction to the passenger who desires to travel frequently between given places during a stipulated period and who might be prevented from travelling at ordinary fares owing to inability to pay. Excursion fares encourage quantity traffic which might not otherwise pass and may also be used as a means of regulating traffic flow, for example, by filling vehicles normally running in the opposite direction to the prevailing flow with light or no loads. In the operation of reduced fares, care has to be taken that, while creating new traffic, they do not cause diversion of full fare-paying passengers.

CHAPTER XI

MONOPOLY AND COMPETITION

MONOPOLY conditions prevail when the supply of transport is not sufficient to meet the demand. In such circumstances a transport undertaking is able to charge for conveyance a rate or fare to the fullest extent of the value of the service of transport without fear of the traffic (*a*) ceasing to pass, or (*b*) being diverted to another carrier.

To return to the illustration used in the previous chapter: the lad with the barrow is able to charge up to the limit of the value of the service of transport, that is, he is able to operate as a *monopoly* only if there is no other person competing with him on price. If another lad should buy a barrow, there would be two transport agencies available in the village, but, if there should still be a greater demand than both lads could fill, they could charge equally up to the limit. There would be no competition on price but they could compete in other directions: for example, one barrow might be kept in a cleaner condition than the other; one lad might be more civil than the other.

If the village demand for transport should be less than that supplied by the two lads, that is to say, if there should be more than sufficient transport provided, one of the lads would probably charge less than the other. The original carrier might charge less than the newcomer in order that old customers might be retained; the newcomer might charge less than the established lad in order to attract customers from him.

The one who charges more is affected by *parallel competition*; it arises on the route of operation equally served by both.

The goods barrowed to the market are sold at ten shillings only so long as similar goods from other sources are not delivered at a lower charge. If carriers from A, B, and C (Fig. 4), all places nearer to the market, deliver at a cost which enables the goods to be sold at 9s. 6d. those from the village will cease to be sold at ten shillings. The value of the service of transport from the village to the market will thus be reduced to 1s. 6d. Even if there is monopoly operation by a lad from the village it will be impossible for him to charge two shillings and retain the traffic. He will therefore be forced, by *indirect competition*, to reduce his charge.

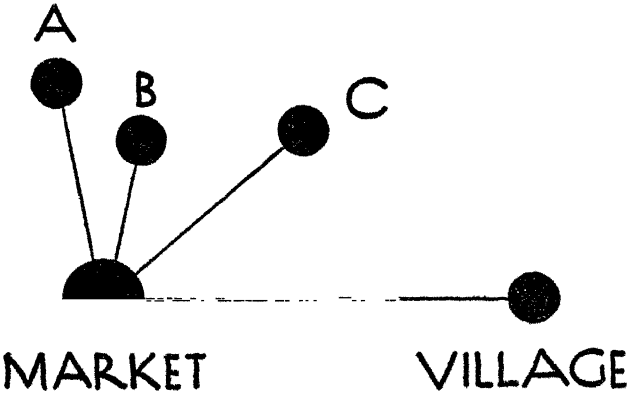

FIG. 4

But whatever the value of the service of transport, if the two lads should compete on price they should not lower their rates to a point below the cost of service.

If the cost is not at least equalled, operation is at a loss and must inevitably result in the carrier's going out of business.

From the customers' viewpoint competition is desirable. When reasonably practised it results in good service, although a user of more than one transport undertaking may sometimes "play off" one against the other on price. From the operator's point of view, competition is not desirable when it has the effect of reducing rates to below those the customers would be willing to pay if there were no alternative means of transport. When this happens, the user is benefited unreasonably, for, if all the operators concerned were to agree on rates, there could be no rate-cutting except for special reasons and the user would be unable to secure transport service at a cost below agreed minima. Assuming an agreed rate were not so high as to prevent the traffic passing, there would be money in a carrier's pocket which, if rate-cutting were uncurbed, would be in the user's.

Competition on price is compulsorily eliminated when standard rates and fares are prescribed by an authority able to do so. Competition is then still possible on speed, comfort, or other factors.

Wasteful competition may be removed by agreement between the operators concerned in respect of (*a*) territory; (*b*) joint working or through running; (*c*) pooling; (*d*) restriction of operation. The effect of such agreements is the bringing of operation nearer to a monopolistic than to a competitive state.

A *territorial agreement* provides allotment to each party of an area over which other signatories will not enter. Such an agreement does not prevent competition arising within an area from undertakings not parties to the agreement, but otherwise guarantees exclusive operation in a defined territory.

Joint working or *through running agreements* are made primarily for the purpose of eliminating unnecessary operation. When two or more undertakings serve adjoining areas, or if their services overlap, an agreement may be made with the object of allowing the parties to penetrate each other's areas and removing duplication of operation. The allocation of working costs and distribution of receipts are matters of local arrangement according to circumstances.

Pooling agreements, applying to all traffic that would otherwise be competitive, provide that the undertakings concerned shall, after deduction of set working expenses, subscribe their profits to a pool for redistribution on an agreed basis, usually calculated on pre-pool practice.

Restriction of operation may be the subject of an agreement, the parties arranging not to operate new services competitively and possibly to keep the number of trips on existing competitive routes within a stated maximum.

Operators of the same type of transport often make an arrangement whereby periodic *conferences* are held for the purpose of agreeing rates and other matters relating to competition.

CHAPTER XII

CO-ORDINATION

Co-ordination of transport is an ideal towards which progress must be gradual owing to the present difficulty of removing the effects of unchecked transport development in the past. When the benefits of a discovery or invention are eagerly sought, the demand for some time often exceeds the available supply. This was the case when mechanization of transport was introduced. But instead of being reasonably adjusted to meet the demand, the supply of transport was more often planned in relation to the possible financial advantage to the proprietors of the systems concerned. This led to considerable overlapping where offered traffic was plentiful. So long as the demand actually exceeded the total supply this was not a serious matter, but when the supply exceeded the demand the competition that arose was frequently wasteful.

If a lump of sugar is put into a glass of water it dissolves. A second would probably dissolve too. So, also, might a third. But sugar could not be added indefinitely and expected to dissolve. There would come a time when the water would cease to absorb further sugar and any lumps added after that would remain solid. The limit of absorption by the water is the saturation point. In transport the *saturation point* is reached when there is such a number of transport agencies serving a given demand that, after the maximum possible requirements have been met, some of the agencies are redundant.

Co-ordination is aimed first at eliminating redundancy. That having been accomplished, the remaining available transport in a co-ordinated scheme would be adjusted according to the functions of the respective units.

To every form of transport there may be prescribed a sphere within which it operates efficiently and economically and outside of which operation is difficult and costly. Spheres of transport operation vary in extent and depend upon the true functions of the individual types of transport. One kind of transport may, for instance, be particularly fitted for carrying heavy loads for considerable distances; another may be ideal for making frequent short journeys within a restricted radius. If the two were co-ordinated, the latter type would be used to collect units of traffic and pass them to the former for aggregation and conveyance.

A scheme of co-ordination, to be effective, must take into consideration every available type of transport within its scope.

Co-ordination may be (*a*) voluntary (as when transport agencies of different kinds associate with or without financial interest in each other), or (*b*) compulsory (for example, by State regulation).

CHAPTER XIII

LICENSING

LICENSING is the ensuring, by a person or body exclusively able to do so, of the fulfilment of a certain requirement, generally by the issue of a token. The token, known as a licence, is the evidence of (*a*) permission to do a particular thing, or (*b*) certification that a prescribed course has been taken.

A scheme of licensing is operated for one or more of the following purposes: (1) restriction; (2) collection of revenue; (3) regulation; (4) registration.

Restrictive licences are naturally the most difficult to secure because their very purpose is the minimizing of the use of an article or the retarding of some process of development that would otherwise be rapid. In transport operation restrictive licences are issued for (*a*) the prevention or removal of wasteful competition; (*b*) the elimination of non-economic services; (*c*) the protection of a monopoly.

Purposes (*a*) and (*b*) are the natural outcome of over-supply in relation to demand. Licensing has the effect of preventing indiscriminate operation and protects both providers and users of the transport services that are actually allowed to operate. There is usually a right of objection by existing operators to applications for the issue of new restrictive licences or proposed modification in the direction of increase.

The third purpose is artificial and is used where a State, public, or subsidized body is considered, or required to be, capable of supplying all demand for the type of service it provides.

Revenue licences ensure the making of a prescribed payment. This may be (*a*) local or national taxation (i) entirely or partly devoted to an expenditure benefiting transport; (ii) used for the general expenditure of the taxing body and not specifically benefiting transport, or (*b*) a commutation of some toll chargeable against the licensee for a service enjoyed (e.g. the use of a privately-maintained bridge).

Whereas the aim in issuing restrictive licences is to keep the number to a minimum, the object of revenue licences obviously requires that as many as possible should be taken out.

Regulative licences are issued when it is necessary or desirable to effect some control over the licensee. In the operation of transport, control may be exercised in connexion with, among others, the following matters—

(1) The charging of prescribed fares and rates;
(2) Compliance with imposed conditions;
(3) Public safety;
(4) Operation on specified roads or routes from a specified point;
(5) Times and frequency of operation;
(6) Conduct of operators and users;
(7) Construction and maintenance of vehicles and buildings;
(8) Efficiency and health of employees;
(9) Observance of prescribed wages minima;
(10) Hours of duty of operating staffs.

Enforcement of control by a licensing authority is by revocation or suspension of a regulative licence and may be accompanied by disqualification for further licences.

The issue of licences for the purpose of *registration* is usually formal but, to be effective, must be general within the scope of the requirements of a particular scheme. To encourage this the cost of registration must be purely nominal. Upon declaration, the licensee is allotted a distinctive mark or number, or both, for the purpose of identification.

Composite licences are frequently used in the licensing of transport in order to ensure the automatic fulfilment of more than one requirement. Examples are (*a*) registration plus revenue payment; (*b*) revenue payment plus regulation; (*c*) regulation plus registration.

An essential feature of all licensing systems is that authority to license must be vested in one person or body alone. It must be impossible for two to hold similar authority except where each has exclusive territorial powers or one acts as agent for another.

State licensing schemes operate nationally, but may be administered either nationally or regionally. Regional schemes are sometimes optional as to adoption by the respective authorities and, once adopted, are administered exclusively within each region.

The operation of a national scheme by regional authorities, especially in the issue of restrictive licences, is more desirable than by a central body. Decentralization leads to a better appreciation of local circumstances and requirements, especially when a regional licensing authority is in touch with local bodies and administrative officers by means of (*a*) consultation; (*b*) representation on the authority.

Where a system is operated regionally and the incidence of a licence issued primarily by one region affects others, endorsement by other regions in confirmation of the primary licence ensures that the system as administered by one region is not inconsistent with the practice in others.

In the issue of restrictive, and sometimes regulative, licences, a necessary feature is the right of appeal by an applicant to a higher body in order to correct any omission or failure on the part of a licensing authority.

CHAPTER XIV

TRAFFIC OPERATION

THE traffic operating department has two outstanding duties: (1) towards the users of the undertaking to fill their requirements for actual transport or service, and (2) (a two-fold duty) towards the undertaking itself to (*a*) work the traffic as economically as possible, and (*b*) keep the stock and equipment as fully employed as possible, for idle stock is a drag upon capital and revenue. (If two identical units are put into service on the same day and are both finally withdrawn from use on a certain date, their cost to the undertaking may be equal but their comparative value can be judged only by the number of days each has been active.)

By the time the operating department becomes responsible for the conveyance of a person or consignment, the important factor of cost may be assumed to have been settled: the passenger or the consignor of goods has paid, or expressed a willingness to pay, the fare or rate charged by the undertaking. There remains then the factor of time to be observed. A unit, once accepted, should be taken to the destination in the quickest possible time unless, in consideration of the payment of a lower fare or rate, the customer has chosen slower transit.

If every stage of operation (loading, conveying, unloading, delivering) is so organized that only the least possible time is spent in the handling of a unit of traffic the effect will be (*a*) to reduce the cost of handling; (*b*) to utilize labour and appliances to the maximum, assuming that the organization provides also for continuous employment of men, machines, and stock.

The actual *acceptance* of traffic is usually the work of the commercial department whose duty it is to book it and pass it to the operating department in the quickest time. If the traffic is for immediate forwarding, the action of acceptance and the commencement of conveyance are more or less synchronous; the operating department should be in a position to carry the unit of traffic immediately the commercial department has completed a formality, such as the issue of a ticket. There may be reasons why a unit should not be forwarded immediately, for example, a customs examination or the need to hold small units for bulking and conveying more economically, in which cases waiting or storage accommodation must be provided capable of holding the maximum traffic likely to be deferred at one time.

Accommodation should be ample for immediate requirements and designed to allow for expansion with growth of traffic. The lay-out of a terminal or other point of acceptance or delivery should bear relationship to the work to be performed, the flow and geographical distribution of the traffic to be handled, and other operating factors, the position and extent of the facilities provided being arrived at only after careful study of available data.

The actual transit commences with the loading of the unit. Loading requirements vary: passengers usually choose their own accommodation and load themselves; goods require handling. Proper loading is important; the capacity of the stock should be packed to its limit. The employment of trained staff and the use of mechanical appliances to facilitate their work should result in a maximum load being provided and also in saving of loading time. The cheapest possible operation is the movement of a maximum load for a maximum distance and therefore loads should be made up and vehicles packed with a view to sending forward to the farthest possible point at one haul. If it should not be possible to provide a through load to a distant point, an operator may be able to load as much as possible to an intermediate place, there to be combined with other part loads for conveyance as a full load to destination.

In vehicle design the ratio of tare or unladen weight to the gross load actually hauled should be kept as low as possible and the net load, or "pay load," as high as possible. Sometimes, especially in passenger vehicles, loading capacity has to be reduced owing to the provision of some necessary feature related to preservation, comfort, safety, etc., of the load.

Accommodation for vehicles should include provision for frequent cleansing and inspection and allowance for overhaul at regular intervals with little loss to active running time.

Transport services may be (*a*) frequently regular; (*b*) infrequently regular; or (*c*) operated according to a particular demand.

In planning regular services the following have to be considered: (*a*) time necessary for terminal duties towards the service; (*b*) journey time; (*c*) intermediate stopping times and places; (*d*) connexions at certain points; (*e*) recognized frequency. As far as possible services should be arranged to balance, that is, the number of outward trips from a centre should be equalled by the number of inward trips. Otherwise it becomes necessary to incur waste mileage in working empty stock from the centre to "take up" working at the far end of a route where stock, owing to non-balanced operation, is not available. The simplest form of operation is the frequent "shuttle" service which passes backwards and forwards between two points A and B. Infrequent services may cause long lay-over periods at a terminal, but it is sometimes possible for flexible transport units, by running small light mileage beyond or laterally to a normal terminal, to fill in the time of a lay-over interval by working "out" and "home" trips on an adjacent route.

Graphic representation of times, giving particulars of services in diagrammatic form, facilitates the theoretical arrangement and interworking of units. Such diagrams, when completed and checked against practical difficulties, have to be translated into the customary timetables for the use of the operating staff and the public.

Transport which has to be operated according to the demand of the customer (e.g. a "guaranteed" excursion train, a road contract goods service) may incur considerable terminal waste of time or, if the service is required in one direction only, light mileage, unless there exists some means whereby the otherwise wasted time or capacity may be utilized. Where there is no demand to be filled during the period of enforced layover or the light running, there can be no utilization. On the other hand, there may be nothing offering at A when relief transport is badly needed at B.

So long as the two places A and B have means of quick inter-communication, demand and supply can be adjusted between them. But if, say, five places, A, B, C, D, and E, all require to fill fluctuating requirements, the official in charge of any one of the points would need to get into communication with four others in order to secure assistance or relief.

It is easy to estimate the time taken in telephoning by even these five points; if fifty points were involved, inter-communication would be out of the question.

Now, in addition to the five points mentioned above, add a sixth, F, which may be superimposed on A, B, C, D, or E, or set up at a separate place. Maintain an office at F constantly in touch with the other five points by telephone and the filling of demand by any one becomes simpler. What is known as "traffic control" can be established. The controller at F, to whom reports should be made at regular times each day, as well as in an emergency, by A, B, C, D, and E, can record on a chart the latest position as reported. Thus he will have a "bird's-eye view" of the area within his control.

The nature of traffic control varies according to the type of transport undertaking employing it, but broadly it is used in connexion with the following details of operation: (1) the supply of stock; (2) the distribution of tractive power where the stock is not tractive in itself; (3) the provision and relief of operating staff; (4) the operation of individual services; (5) the maintenance of time margins where services connect; (6) the arrangement of relief measures in cases of emergency; (7) the hiring of other means of transport in cases of failure of the type controlled; (8) the reservation of seats on trunk services; (9) the provision of return loads.

The final stages of operation are unloading and, usually in the case of freight, delivering the unit after completion of the journey. As with acceptance and loading, it is necessary that (*a*) accommodation should be ample, (*b*) the staff should be efficient, and (*c*) mechanical appliances and other aids to speedy working should be provided.

Traffic regulation systems are desirable in all forms of transport, and essential in the operation of inflexible transport (e.g. the railway block system), in order to (1) prevent unnecessary delay, (2) maintain priority of progress, and (3) ensure safety.

In the provision of sufficient operating staff to cover all requirements, necessary relief must be available for the prevention of long hours, not only owing to the extra cost of overtime and the danger of fatigue, but also by reason of (1) limitation of hours agreed between masters and men, or (2) State regulation.

Records of operation may be required by law, but reports of working should be rendered in a specified form by all staffs concerned in operating individual services in order that it may be possible to locate direct faults, for example unnecessary delay. In the review of results by the operating officer over a period, statistics may be used to advantage, tendencies being quickly revealed by the comparison of various standard units from differing aspects. Traffic flow and density, not always apparent by other methods, can be recorded by means of occasional censuses.

CHAPTER XV

STAFF

THE general stability of the larger transport undertakings is reflected in the security of their staffs. It is seldom that, once engaged, an employee is dismissed except for such strong reasons as dishonesty or insubordination; it is common for men to serve from boyhood to old age.

This permanency of employment and a duty to the users of an undertaking to give them efficient and reliable service render careful recruitment necessary, especially in the engagement of staff likely to reach supervisory positions. Recruitment in the past was often haphazard and resulted in men being engaged to do work for which they were unsuited.

In more recent times it has been appreciated that, unless a man has ability to do a particular job that is also congenial to him, his work is not likely to be highly efficient. A certain standard of efficiency may be reached but never exceeded. Nowadays it is possible, by tests based on psychological reaction, to prescribe the work likely to be most suitable for a candidate desiring engagement.

Vocational tests and educational attainments themselves may not always be accepted as indications of a recruit's eligibility, and selection committees, composed of experienced officers of an undertaking, may be set up to interview intending employees and judge their suitability for service. The interviewees are questioned on general knowledge, hobbies, and other matters with a view to their capabilities being assessed. Many undertakings have systems whereby cadets, or apprentices, are recruited from the universities and public schools. After a period of general training in the various departments, the apprentices, subject to approval by a selection committee, are appointed to minor posts of responsibility and, in due course, to officers' positions. Employees already in the service are also frequently given opportunities of competing for apprenticeship.

An undertaking's employees may be engaged (*a*) permanently, (*b*) on probation with automatic appointment at the expiry of the probationary period if satisfactory, (*c*) temporarily. Some forms of transport are subject to violent peak periods of operation (for example, the unloading of a ship), and the inability to provide steady occupation prevents the engagement of a large permanent staff. Therefore a small regular staff is supplemented as necessary by casual labour.

Upon entry into the service of an undertaking the conditions of employment, if not defined in a specific contract, are assumed to be accepted by the employee. Conditions may be (*a*) framed by the employer without consulting the employees; (*b*) agreed directly between employer and employees; (*c*) agreed collectively between representatives of employers and men, or (*d*) prescribed by the State.

Representation of the employees may be through trade unions according to procedure (*a*) agreed with the employers, (*b*) laid down by statute. The organization of negotiating machinery usually includes small units for the settlement of purely local differences, then a larger area unit for dealing with matters not disposed of locally, and finally a tribunal for the consideration of items of importance to the industry as a whole or a branch of it. Statutory procedure usually includes a national conciliation board composed of masters and men, possibly with an independent chairman, to which are responsible regional conciliation boards composed of masters and men in the locality. Wages and conditions of service prescribed by a national conciliation board may be scaled and classified for adoption by the regions according to whether they are city, provincial, industrial, or agricultural areas. Local differences of opinion as to adoption of national scales may be settled by arbitration; other difficulties not capable of local solution may be removed by the national board.

Small, local observance committees, composed of representatives of masters and men, usually drawn from the local negotiating unit, are sometimes set up for the purpose of detecting and reporting breaches of agreement by either side.

The principal subject of agreement is rates of pay. These may be fixed according to (1) area of employment; (2) duties and responsibility of the employee; and (3) area of domicile, with provision for allowances or additional payment when a man (*a*) temporarily undertakes increased responsibility, (*b*) is put to some inconvenience, (*c*) works longer than his rostered duty, (*d*) takes duty on Sundays and public festivals, (*e*) incurs expense in carrying out his duties (for example, by having to lodge away from his normal place of domicile). Hours of duty, meal-times, and sufficient rest periods may either be provided by law or be the subject of agreement. Annual leave is a matter of agreement.

The output or behaviour of employees may be improved by the provision of incentive means, such as piecework or tonnage payments, and mileage bonuses. The payment of bonuses may also encourage economy and efficiency of operation, e.g. in the saving of fuel or the prevention of accidents.

Various methods of discipline exist, ranging from peremptory action by the employer to involved systems of marks awards aimed at distinguishing between habitual and occasional offenders. Punishment varies from formal reprimand to suspension or dismissal but conditions of employment often provide for the attendance of an advocate with an employee during a disciplinary inquiry.

CHAPTER XVI

ANCILLARY UNDERTAKINGS

THE word "ancillary" is used in its strictest sense to describe the work of a maidservant. Its use in connexion with transport is perhaps not far removed; it is applied to undertakings that are subservient to others in an essential capacity. Transport undertakings may have ancillary businesses or transport may be itself ancillary to commercial undertakings.

The primary duty of a transport undertaking is the actual conveyance of passengers or goods. But before traffic may pass from A to B it may require certain services performed towards it apart from ordinary terminal duties directly related to conveyance. Similarly, after arrival at B, further essential services may be required.

In some cases such services (for example, the collection, delivery, or bulking of goods by one means of transport for conveyance by another) are provided by authorized agents remunerated by the undertaking with which they closely work or by those forwarding or receiving the traffic. In others, the services are provided by the main transport undertaking itself.

Businesses ancillary to transport are not necessarily of a similar nature but may exist for such purposes as the provision of food and comfort to passengers, either terminally or during conveyance.

When an undertaking employed by another enjoys certain features of the main organization, it is necessary, in order to arrive at accurate traffic results, that the ancillary undertaking should be debited with the cost of provision. Where, for instance, buildings are used alike by principal and ancillary organizations, the value to both should be appropriated, although complete segregation of expenses is often difficult.

In the other direction, proper credit should be given to the ancillary undertaking where earned. It is simple to dissect the rate or fare that includes remuneration of both main and ancillary businesses if the rate is merely the summation of the two sets of charges. When an inclusive rate is charged which is less than the total of the separate rates, it is usual to apportion the receipts *pro rata*. For example, if the principal undertaking's charge is 6s. 0d., and the ancillary's 1s. 6d., an earned inclusive rate of 6s. 3d. would be credited in the proportion 5s. 0d. and 1s. 3d.

Where the undertaking is served by two or more ancillary businesses, the charges for services exchanged between the subsidiaries should be debited and credited correctly.

There may be a statutory duty (*a*) to dissect and apportion accounts to show the true nature of ancillary revenue and expenditure, in order that the effect of ancillary working upon the principal revenue may be gauged, or (*b*) to declare direct or indirect interest in other undertakings of an ancillary nature.

The need for accurate allocation of costs equally exists where transport is ancillary to manufacturing or other trading organizations in order that the cost of production or selling price may carry a fair share of the conveyance costs. If one officer or one administrative staff should manage both employing and ancillary businesses, the expenses should be charged proportionately to each and if the exact line of demarcation should be difficult to determine, charges should be borne on an estimated basis.

Accurate accountancy helps to reveal the value of ancillary businesses, but losses may be considered justified and offset by the unassessed value of service. Elimination of ancillaries is not therefore so common as subsidization by (*a*) the automatic crediting to a subsidiary business of a fixed proportion of the principal undertaking's annual turnover, or (*b*) remittance of actual losses. Profits of an ancillary are usually retained as reserve against future fluctuations of revenue.

CHAPTER XVII

PUBLICITY

A COMMODITY or service can be sold only when there is a demand for it. Demand may be natural, as in the case of necessities of life, or it may be created. Even where there is a natural demand it may be necessary to regulate it, and a created demand may also require adjustment from time to time.

The creation or regulation of demand, important features of the sale of transport, are possible by the employment of publicity.

In modern commercial practice the term is interpreted widely, but it is simply a scientific "making known" of facts for a persuasive purpose.

Publicity may be direct, for example, advertising by means of posters, or indirect, such as by methods of propaganda not easily recognizable by the persons whom it is designed to influence.

The control of direct publicity may be the duty of an *advertising manager* or a commercial officer of the undertaking. Indirect publicity may fall within the scope of the secretary's department or, if work in connexion with it should be heavy, it may be necessary to appoint a *public relations officer* to act as sole contact with the Press and public in giving information about the undertaking, arranging visits to it by interested persons, making official statements of policy, explanation, contradiction, etc.

A transport undertaking is at an advantage compared with the average trading firm in being able partly to cover, and sometimes to exceed, its expenditure on account of its own publicity by earnings from the exhibition of advertisements of others on its property and vehicles. The appropriation of out-payments and the collection of revenue may be under the control of one officer, in which case it is necessary to distinguish the undertaking's own advertising from that of others. This may be done by referring to the former as *traffic advertising*, and to the latter as *commercial advertising*.

Traffic advertising is, as its name suggests, closely concerned with the traffic department's work and occasionally with that of ancillary undertakings. Examples of traffic advertising are: the use of a distinctive token or nameplate on buildings, vehicles, and literature; traffic signs on or away from premises; time-table books and sheets, handbills, posters, and booklets relating to facilities. The advertising manager is sometimes required to collaborate with the providing departments on the subject of standardization of design, colouring, and decoration of vehicles and other things used by the traffic department.

Broadly the work of the traffic advertising department is divided into (*a*) production, and (*b*) distribution.

In the production of advertising for the purpose of creating travel (as on a new route or service) or attracting traffic to a special service of which the nucleus has already been secured, the initiative is with the traffic department, which makes its requirements known to the advertising department and thereafter works in close conjunction with it. When traffic has been created, it is necessary to sustain it by suitable methods, followed by the advertising department alone, but subject to collaboration with the traffic department as required.

While the result of traffic advertising depends largely upon the ability of the matter produced to arouse interest and persuade prospective users to take advantage of the service or facility offered, much also depends upon the way in which distribution is effected and the extent to which potential customers are reached.

Production may be improved and matter more effectively distributed if there is co-operation between the transport undertaking and other persons or bodies interested in an object to which transport contributes, such as the success of an exhibition or the development of a resort.

CHAPTER XVIII

THE FUTURE OF TRANSPORT

THE more recent development of transport has been at a rapid rate. Within a comparatively short period of time more progressive changes have been made than during whole centuries past. Although there has been acceleration of development owing to the needs arising from war and industrial conflict, natural progress has also been stimulated by changing public demand. It is not possible to say what factors will enter into transport's future development, and prediction is therefore extremely difficult.

It is hard to imagine in what direction great changes will come, just as, at the end of the nineteenth century, when the internal combustion engine was young, there was little anticipation of its subsequent wide use on land and sea and in the air, with its consequent repercussions.

The power to forecast accurately is of untold value to the transport operator, and, if it were possible to do so at this moment, present capital expenditure could be made to allow for future development and so save considerable expense at some distant time.

Invention of transport means arising from bare necessity has probably now ceased, but demand for improvement in various directions has constantly to be filled, particularly in the provision of speed and comfort at low cost.

The future will probably see the introduction of revolutionary forms of transport's essentials: the Way, the Vehicle, and the Motive Power. Subterranean and submarine Ways will likely be common.

Possibly the Way by land will be almost entirely artificial and capable of operation in any kind of weather. Science may discover means of dispelling fog and of reducing the effects of snow and ice. Illumination may be so far improved as to enable traffic operations at night to be carried out as easily as during daylight. Traffic safety measures will certainly be developed at a fast rate and may possibly become so reliable as to counteract any failure of the human element, assuming that mechanization does not entirely displace those attending the Way.

Durability of materials combined with adaptability and construction may be the outcome of research.

The Vehicle will undoubtedly suffer great changes in the cause of speedy movement. Streamlining and other scientific features of design are at present at the experimental stage. It will be possible, no doubt, for passenger vehicles of large capacity, with comfortable accommodation, to travel at a very high rate of speed without discomfort or risk to those carried; the principles of the rocket and catapult may be applied extensively to the conveyance of freight containers.

The requirements of individual passengers of the future may have to be filled by a Vehicle capable of carrying one person at low cost but combining portability—when not in motion—with the ability to be compressed, when not in use, into a small storage space. There may be a vast improvement in construction of powerless individual vehicles operated by some slight natural movement of the passenger.

The development of Motive Power may be in the direction of the elimination of all kinds of fuel, and the production of distant power capable of cheap and swift transmission or of the generation of a direct power, perhaps by vehicular movement. Improved scientific methods, which are reasonable to visualize, should enable manufactured power to be produced at a very low cost; there may be even utilization of natural forces, such as solar rays, for purposes of movement.

Methods of operating control will probably be improved at a fast rate. The remote control of unmanned vehicles, already at the experimental stage, may be common in relation to goods conveyance. If certain response to some form of radio control could be guaranteed, the passenger vehicle of the future might be safely operated by that means.

Revolutionary administrative systems may be the outcome of realization of the truth that transport is an indispensable factor in the existence of the whole world. There is already a tendency to merge groups of small undertakings. The setting up of centralized bodies, autonomous yet controlled in certain respects by an "outside" authority, may be the following step. In time there may be left no trace of private enterprise, and the provision of transport, like the provision of other essential national services, may come to be recognized as a State's duty towards its members.

All this, however, is and must be broad speculation. It is safe only to say that progress during the remainder of the present century will be at a greater rate than ever before. Those who will operate transport of the future must be educated specialists capable of keeping abreast of that progress.

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